## REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-3 and 26 are presently active in this case.

The Applicants wish to thank Examiner Thuy v. Tran for the courtesies extended to Applicants' representative, Christopher Ward, during the personal interview conducted on July 14, 2004. The arguments set forth herein incorporate the issues discussed during the interview.

Claims 1-3 and 26 were rejected under 35 U.S.C. 103(a) as being unpatentable over Aulanko et al. (U.S. Patent No. 5,899,301) in view of Ericson et al. (U.S. Patent No. 4,848,519) and further in view of Figure 2 of the present application. For the reasons discussed below, the Applicants respectfully traverse the obviousness rejection.

The basic requirements for establishing a *prima facie* case of obviousness as set forth in MPEP 2143 include (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) there must be a reasonable expectation of success, and (3) the reference (or references when combined) must teach or suggest all of the claim limitations. The Applicant submits that a *prima facie* case of obviousness has not been established in the present case because there is no suggestion or motivation to combine the cited references in order to arrive at the present invention recited in Claim 1.

Claim 1 of the present application recites an elevator comprising a movable unit configured to ascend and descend in an elevator shaft, a guide rail configured to guide the movable unit, a cable configured to hang the movable unit, a driving unit mounted on the guide rail and configured to move the movable unit up and down by driving the cable, a plurality of rail support members connected to the guide rail, and a plurality of plates attached to a respective rail support member of the plurality of rail support members. At least one plate of the plurality of plates is fixed to a wall of the elevator shaft by at least two vertically spaced lines of securing members separated from each other by an interval in a vertical direction, and each line of securing members of the at least one plate includes at least one securing member that satisfies an inequality set forth in Claim 1. At least one rail support member of the plurality of rail support members includes a U-shaped member having substantially parallel leg members each having a first end attached to the at least one plate and a second end attached to a base member, the base member being connected to the guide rail.

The Applicants begin by noting that elevator systems in which a drive unit for the elevator is mounted to a structure other than the guide rail is significantly different than a configuration in which a drive unit is mounted to the guide rail. These two different configurations provide drastically different force/weight issues for the components of the systems.

The Aulanko et al. reference is cited for the teaching of elevator machinery (1) with a disc-type motor mounted on a guide rail (6) of the elevator car or counterweight. The

Official Action notes, however, that the Aulanko et al. reference does not disclose how the guide rail is attached to the side wall of the hoistway.

The Aulanko et al. reference depicts in Figures 4 and 5 two different configurations of the elevator machinery (1). Both of these configurations appear to depict the guide rail (6) being suspended by the top (52) of the elevator shaft (52). This mounting structure, along with the cable and pulley arrangements depicted in Figures 4 and 5 of the Aulanko et al. reference provide significantly different force/weight configurations that simply mounting a driving unit to a guide rail and mounting a guide rail to a wall of the elevator shaft in the manner recited in Claim 1. It is unclear whether the Aulanko et al. reference even provides a structure that would require a mounting configuration as recited in Claim 1 of the present application. Thus, the Applicants submit that the Aulanko et al. reference not only does not provide a teaching of the mounting configuration of the guide rail to the wall of the elevator shaft, but it is also unclear whether the Aulanko et al. reference even provides one of ordinary skill in the art with the same problems that are solved by using the mounting configuration of the present invention. Therefore, the Applicants submit that the Aulanko et al. reference does not provide one of ordinary skill in the art with a motivation to modify the Aulanko et al. reference to arrive at the present invention. As discussed below, the remaining cited references also do not provide one of ordinary skill in the art with such a motivation, since they are directed to structures in which a drive unit is not mounted to the guide rail. In other words, one of skill in the art would not have looked to the remaining cited references to solve

problems associated with the mounting of guide rails with drive units fixed thereto, since the remaining references do not deal with such subject matter.

Figure 2 of the present application is cited for the teaching of a manner of mounting the guide rail to the wall of the elevator shaft using U-shaped support members. However, Figure 2 does not depict or contemplate mounting the guide rail by fixing at least one plate to the wall of the elevator shaft by at least two vertically spaced lines of securing members separated from each other by an interval in a vertical direction. Such a configuration is not taught or even needed with the configuration shown in Figure 2, since the configuration in Figure 2 does not teach the mounting of a driving unit on the guide rail. Thus, Figure 2 does not provide a motivation to mount the guide rail to the wall of the elevator shaft in any manner other than that depicted in Figure 2.

The Ericson et al. reference is cited for the teaching of mounting a guide rail to an elevator shaft via a plurality of rail support members separated from each other by an interval in a vertical direction. However, the Applicants respectfully submit that one of ordinary skill in the art would not have looked to the Ericson et al. reference to solve the problems associated with mounting a guide rail to a wall of an elevator shaft when the guide rail has a drive unit fix thereto, since the Ericson et al. reference does not contemplate such a structure, but rather teaches a distinctly different configuration in which the drive unit is fully mounted on the bottom of the elevator shaft.

The Ericson et al. reference clearly depicts in Figure 1 a hydraulic elevator (10) that has it's fully weight supported by a pair of jacks (45) on the floor of the elevator shaft. The

Ericson et al. reference does depict fixtures (265) bolted to the hoistway walls, however, the configuration of the jacks (45) fully supported by the floor of the elevator shaft would not lead one of ordinary skill in the art to believe that the fixtures (265) would be sufficient or desirable for use in a configuration in which a drive unit is fixed to the guide rail. In fact, the clamps (260) depicted in the Ericson et al. reference do not even appear to provide vertical support for the guide rail. Accordingly, one of ordinary skill in the art would not have been motivated to combine the teachings of the Ericson et al. reference with the teachings of the Aulanko et al. reference.

The present invention provides significant advantages that were not contemplated by the cited references. The Applicants respectfully submit that the Ericson et al. reference and Figure 2 of the present application should not be combined with the Aulanko et al. reference since the Ericson et al. reference and Figure 2 are directed to distinctly different configuration in which the drive unit is not fixed to the guide rail, and thus one of ordinary skill in the art would not have looked to these references to solve the problem of how to mount the guide rail of the Aulanko et al. reference to the wall of the elevator shaft, which is not disclosed in the Aulanko et al. reference.

The Applicants, therefore, respectfully submit that the rejection is based on the improper application of hindsight considerations. It is well settled that it is impermissible simply to engage in hindsight reconstruction of the claimed invention, using Applicants' structure as a template and selecting elements from the references to fill in the gaps. *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991). Recognizing, after the fact, that

a modification of the prior art would provide an improvement or advantage, without suggestion thereof by the prior art, rather than dictating a conclusion of obviousness, is an indication of improper application of hindsight considerations. Simplicity and hindsight are not proper criteria for resolving obviousness. *In re Warner*, 397 F.2d 1011, 154 USPQ 173 (CCPA 1967).

In the case of a conventional elevator in which the drive unit is arranged in the machinery chamber, usually only the elevator's own weight acts on the guide rail in the lengthwise direction of the guide rail (i.e., the vertical direction), excluding special cases such as emergency stops. Also, when the guide rail is installed, the guide rail is arranged such that successive guide rail sections are stacked from the floor of the pit and these are fastened to the wall of the elevator shaft (ascending/descending path) by mounting elements at prescribed locations. Since the lowermost end of the guide rail is supported by the floor of the pit, the weight of the guide rails is finally supported by this floor.

In the conventional aforesaid mounting configurations, it suffices for the guide rail to be capable of withstanding force in the horizontal direction so that is does not tip over and a large bending moment is not generated at the regions where fixing to the elevator shaft (ascending/descending path) is effected. However, in the case of an elevator that does not have a machinery room or chamber, for example when the drive unit is fixed to the guide rail, an extremely large load (W)(the so-called sheave shaft load that can include, for example, the weight of the hoist machine (as shown in FIG. 3(a)) and/or the weight of the passenger cage, the weight of the objects loaded within the passenger cage, and the weight of the

counterweight) acts on the guide rail in the vertical direction. Accompanying this, a large load (Fb) in the vertical directions acts on the tip of the aforesaid mounting elements.

Also, it is necessary to secure space for installing the hoist machine between the guide rail and wall of the elevator shaft (ascending/descending path), so that a prescribed distance (h) between the guide rail and the wall of the elevator shaft (ascending/descending path) is necessary.

Thus, the following two features are characteristic of an elevator without a machinery chamber:

(1) a large load (Fb) in the vertical direction acts on the guide rail mounting element; and

(2) a prescribed distance (h) is required between the guide rail and the wall of the elevator shaft (ascending/descending path).

A large bending moment (Fb x h) is therefore generated in the region where the mounting element is fixed to the wall of the elevator shaft (ascending/descending path), resulting in the characteristic problem of elevators where the drive unit is fixed to the guide rail that the securing members that are employed in the fixing region must be able to withstand this large moment.

Since, in the prior art elevator, the weight of the guide rail is typically borne by the floor, it tends to be assumed that the load (W) that acts on the guide rail of an elevator with the drive unit fixed to the guide rail is also borne by the floor, but this is an error. In fact, the load (W) that acts on the guide rail is borne in shared fashion by the guide rail mounting

element and the main body (floor) of the guide rail.

That is, as described above, in order to understand and solve the characteristic problem of an elevator where the drive unit is fixed to the guide rail (i.e., that the securing member must be able to withstand a large moment), then it is necessary to understand the following points.

The load (W) that acts on the guide rail is borne in shared fashion by the guide rail mounting element and the main body (floor) of the guide rail, if the loads that are thus apportioned to the guide rail mounting element and the main body (4) of the guide rail are respectively represented by Fb and Fr, where Fb is at least of a non-negligible magnitude in comparison with Fr.

The Calculation Model presented during the personal interview conducted on September 16, 2003, shows an example in which the loads that are apportioned to the guide rail mounting element and the main body (4) of the guide rail are calculated.

Unless a novel method of design, that was not previously available, is employed, the problem described above of large moment forces is unsolvable. The inventors discovered that a method of solving the aforesaid characteristic problem included fixing the mounting element by at least two rows of securing elements separated in the vertical direction of the elevator shaft (ascending/descending path).

The characteristic feature of the present invention does not lie in employing a plurality of anchor bolts as the securing members, but rather in arranging these in separated fashion in the vertical direction, so that the bending moment that acts thereon can be

supported by axial force of the anchor bolts.

The attached Appendix shows a comparison of the stress that is generated in the securing members in the case in which these are not arranged in separated fashion in the vertical direction (i.e. the conventional construction) and the case in which these are arranged is separated fashion in the vertical direction (construction of the present invention).

In the Appendix, it is assumed that the diameter (d) of the anchor bolts is 10 mm and the interval at which they are mounted (L) is 30 mm. The results of the comparison may be summarized as follows:

A) Case where the bolts are not arranged in separated fashion in the vertical direction

If the moment acting on the portion in question is assumed to be M, the stress ($\sigma 1$) generated in the anchor bolts is: $\sigma 21 = M/98$; and

B) Case where the bolts are arranged in separated fashion in the vertical direction

If the moment acting on the portion in questions is assumed to be M, the stress ($\sigma 2$) generated in the anchor bolts is: $\sigma 2 = M/2355$

A comparison of the stresses determined in the Appendix shows the following: $\sigma 2 / \sigma 1 = 1/24$.

Thus, by arranging the securing members in a separated fashion in the vertical direction, so that the bending moment acting thereon is borne by the axial force of the securing member, then the stress that is generated in the securing members is reduced by a factor of about 1/24 (when d = 10, L = 30). Although the number of securing members is doubled, the stress that is generated therein can be reduced by a factor of about 1/24, so an

extremely large benefit in terms of reduction in stress can be obtained compared with the amount of increase in the number of anchor bolts.

In the present calculation, it was assumed that L = 30, however, if L is made larger, then the benefit is even further increased.

None of the cited reference teaches or suggests such a benefit.

For example, with respect to the Ericson et al. reference, no large moment acts on the anchor bolts employed for fixing the fixtures (265) for the reasons that (a) no large load produced by a sheave shaft load acts on the guide rail (Fb = 0), and (b) the distance between the back face of the guide rail and the wall of the elevator shaft (ascending /descending path) is practically 0 (h = 0). Consequently, although these anchor bolts need to have sufficient strength for fixing the guide rail to the wall of the elevator shaft (ascending/descending path), no study is made regarding the strength is respect of large loads produced by the sheave shaft load and there is not specific description regarding mounting of the anchor bolts.

Also, appropriate design of the securing members cannot be achieved unless a concept, which is absent from the prior art, is introduced, namely, sharing the sheave shaft load (W) acting on the guide rail between the guide rail whose bottom section is supported by the floor of the elevator shaft (ascending/descending path) and the structures that support the guide rail from the wall of the elevator shaft (ascending/descending path).

Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection.

Claims 2, 3, and 26 are considered allowable for the reasons advanced for Claim 1 from which they depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed, taught, nor suggested by the applied references when those features are considered within the context of Claim 1.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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